



Original Article

COMPARATIVE STUDY OF ULTRASONOGRAPHIC FINDINGS WITH THE OPERATIVE FINDINGS OF BILIARY SURGERY

Zubayer Ahmad¹, Mohammad Ali², Kazi Israt Jahan³,
A B M Khurshid Alam⁴, G M Morshed⁵

Abstract

Background: Biliary disease is one of the most common surgical problems encountered all over the world. Ultrasound is widely accepted for the diagnosis of biliary system disease. However, it is a highly operator dependent imaging modality and its diagnostic success is also influenced by the situation, such as non-fasting, obesity, intestinal gas.

Objective: To compare the ultrasonographic findings with the peroperative findings in biliary surgery.

Methods: This prospective study was conducted in General Hospital, Comilla between the periods of July 2006 to June 2008 among 300 patients with biliary diseases for which operative treatment is planned. Comparison between sonographic findings with operative findings were performed.

Results: Right hypochondriac pain and jaundice were two significant symptoms (93% and 15%). Right hypochondriac tenderness, jaundice and palpable gallbladder were most valuable physical findings (respectively, 40%, 15% and 5%). Out of 252 ultrasonically positive gallbladder, stone were confirmed in 249 cases peroperatively. Sensitivity of USG in diagnosis of gallstone disease was 100%. There was, however, 25% false positive rate detection. Specificity was, however, 75% in this case. USG could demonstrate stone in common bile duct in only 12 out of 30 cases. Sensitivity of the test in diagnosing common bile duct stone was 40%, false negative rate 60%. In the series, ultrasonographic sensitivity was 100% in diagnosing stone in cystic duct. USG could detect with relatively good but less sensitivity the presence of chronic cholecystitis (92.3%) and worm inside gallbladder (50%).

Conclusion: Ultrasonography is the most important investigation in the diagnosis of biliary disease and a useful test for patients undergoing operative management for planning and anticipating technical difficulties.

1. Assistant Professor, Department of surgery, Comilla Medical College, Comilla.
2. Junior consultant (surgery), Bagmara 20 bed hospital, Sadar dacin, comilla.
3. Junior consultant (surgery), Upazila health complex, Burichong, comilla.

4. Professor of surgery, Dhaka Medical College, Dhaka.
5. Senior consultant surgery, Comilla Medical College Hospital, Comilla.

Correspondence to: Dr. Zubayer Ahmad, Assistant Professor, Department of surgery, Comilla Medical College. Phone: 01712531142

Introduction

Biliary disease is one of the most common surgical problems encountered all over the world. A diverse spectrum of diseases affects the biliary system. Benign diseases include gall stone disease, acute calculus cholecystitis, Mirizzi syndrome, acute acalculous cholecystitis, chronic cholecystitis, recurrent pyogenic cholangitis, primary sclerosing cholangitis, biliary ascariasis, choledochal cyst. Malignant diseases include carcinoma of the gall bladder and cholangiocarcinoma. Surgery plays an important part in the treatment of biliary diseases. Now a days, almost in every hospital, amongst the routine surgery, gall bladder disease tops the list.

For proper management of patients, preoperative specific diagnosis is essential. Investigations available for diagnosis of biliary disease are ultrasonography (USG), percutaneous transhepatic cholangiography (PTC), endoscopic retrograde cholangiopancreatography (ERCP), magnetic resonance cholangiopancreatography (MRCP), computerized tomography (CT), radioisotope scanning (cholescintigraphy)

Ultrasound is widely accepted for the diagnosis of biliary system disease. It has the greatest sensitivity for the diagnosis of cholelithiasis (approximately 100%) when compared with other imaging modalities. It is also of great help in the diagnosis of the spectra of appearances in acute and chronic cholecystitis and in the diagnosis of intra- and extra hepatic bile duct dilation. Gallbladder polyps are sonographically easy to detect. Gallbladder carcinomas are usually detected by ultrasound at a late stage by which time the liver is already infiltrated and metastases can be detected; this because the disease presents in advanced age with few early symptoms.

Ultrasound is a routine examination in daily practice and it is the first line imaging modality of choice in many clinical presentations (e.g. abdominal pain) as well as in asymptomatic patients as a screening tool ¹. It is an accurate, safe, non-invasive, inexpensive, accessible, repeatable imaging modality, which is highly sensitive and specific for the detection of many biliary tree diseases and it can frequently demonstrate an alternative diagnosis as the cause of the patient's symptoms if the biliary system is normal². However, it is a highly operator dependent imaging modality and its diagnostic success is also influenced by the situation, such as non-fasting, obesity, presence of surgical dressings and distended abdomen owing to intestinal gas.

Materials and Methods

This prospective study was conducted in General Hospital (Govt. District Sadar Hospital), comilla between the periods of July 2006 to June 2008. Total number of 300 patients diagnosed as having biliary diseases for which operative treatment is planned

were included in the study. Patients with severe acute cholecystitis and planned to treat conservatively and patients with severe co-morbid disease were excluded from the study. Detailed history was taken and thorough physical examination was performed in each case. All patients had ultrasonographic evaluation. Other relevant investigations were also done and noted.

After collection of data, detail comparative and tabulated analysis of sonographic findings with operative findings were performed. Sensitivity, specificity, false positive and false negative detections were calculated relevant to the findings.

Results

Table 1: Clinical features among study population

Symptoms/Signs	No. of patients	Percentage (%)
Pain in the right hypochondriac region	279	93
Pain in the epigastrium	51	17
Dyspepsia	222	74
Radiation to back/shoulder	150	50
Fever	60	20
Anorexia	57	19
Nausea/vomiting	120	40
History of jaundice	24	8
Tenderness in right hypochondrium	120	40
Jaundice	45	15
Murphy's sign positive	15	5
Palpable gallbladder	15	5
Palpable liver	3	1

Table-2: USG findings of patients

Examination results	No. of patients	Percentage (%)
Multiple gall stones	222	74
Thickened gallbladder wall with contracted gallbladder	156	52
Dilatation of biliary tree (both intra and extrahepatic)	39	13
Sludge inside the gallbladder	33	11
Hepatic enlargement	12	4
Cholelithiasis with stone inside hepatic and com mon bile duct	12	4
Solitary gallstone	9	3
Negative for gallstone	9	3
Stone inside cystic duct with distended gallbladder	9	3
Dilatation of intrahepatic biliary tree	6	2
Worm inside gallbladder	6	2
Worm inside hepatic duct and bile duct	3	1
Hepatic metastasis	3	1
Soft tissue mass inside gallbladder with stone	3	1

Table-3: Operative findings of patients

Findings	No. of patients	Percentage (%)
Multiple gallstone	207	69
Thickened gallbladder wall with contracted gallbladder	144	48
Dilatation (generalized) of extrahepatic biliary tree	45	15
Sludge inside the gallbladder	45	15
Lump in relation to gallbladder (inflammation, adhesions)	27	9
Cholelithiasis with choledocholithiasis	24	8
Hepatic enlargement	12	4
Hepatic metastases	12	4
Chronic cholecystitis only	12	4
Solitary gallstone	9	3
Soft tissue mass inside gallbladder	9	3
Stone inside cystic duct with mucocele	9	3
Enlargement of pancreas evident of chronic pancreatitis	9	3
Neoplastic enlargement of pancreas	6	2
Only choledocholithiasis	6	2
Normal HBS (one opened for gallstone and one opened for worm inside gallbladder)	6	2
Intrahepatic biliary tree dilatation	3	1
Worm inside gallbladder	3	1
Worm inside hepatic and bile ducts	3	1

Table-4: Disease pattern of cases studied (on operative confirmation)

Findings	No. of patients	Percentage (%)
Cholelithiasis with chronic cholecystitis	144	48
Cholelithiasis	75	25
Choledocholithiasis with cholelithiasis	24	8
Cholecystitis (acalculus)	12	4
Mucocele with stone impacted at cystic duct	9	3
Carcinoma of gallbladder with gallstone	9	3
Biliary pancreatitis (associated)	9	3
Choledocholithiasis	6	2
Carcinoma head of pancreas	6	2
Normal hepatobiliary system	6	2
Cholangiocarcinoma	3	1
Worm inside gallbladder	3	1
Worm inside hepatic and bile ducts	3	1

Table-5: Comparison between USG and operative findings

Findings	USG		Operative	
	No.	(%)	No.	(%)
Negative for gallstone	9	3	9	3
Gallstones	234	78	228	76
Stones inside common bile ducts	12	4	30	10
Stones in cystic duct	9	3	9	3
Soft tissue mass inside gallbladder	3	1	9	3
Neoplastic lesion of pancreas	0	0	6	2
Soft tissue mass inside common bile duct	0	0	3	1
Dilatation of biliary tree	39	13	45	15
Intrahepatic biliary dilatation	6	2	3	1
Thickening of gallbladder wall with contracted gallbladder	156	52	144	48
Evidence of chronic cholecystitis	165	55	156	52
Presence of sludge inside gallbladder	33	11	45	15
Evidence of biliary pancreatitis	0	0	9	3
Inflammatory adhesions of gallbladder	0	0	27	9
Infiltrative neoplastic lesion of gallbladder	0	0	3	1

Table-5: Type of operations performed

Operations	No. of patients	Percentage (%)
Cholecystectomy	243	81
Cholecystectomy with choledocholithotomy	36	12
Cholecystectomy with liver biopsy	6	2
Whipple's operation	6	2
Cholecystectomy with choledochotomy and extraction of worm from common bile duct	3	1
Cholecystojejunostomy with a Roux-en-Y loop with gastrojejunostomy and enteroenterostomy	3	1
Partial gastrectomy and Cholecystectomy with choledocholithotomy and choledochoduodenostomy	3	1
Hepaticojejunostomy with enteroenterostomy	3	1

Discussion

Biliary surgery is heading the list of routine surgical performance in our country. Ultrasound is widely accepted for the diagnosis of biliary system disease. The causes of its popularity are noninvasiveness, less time for the procedure, low cost and easy availability which have entitled excellent patient compliance.

Pain in the right hypochondriac region was the most common (93%) presenting symptom in this study which correlates with the findings of Huber³ and Burnett et al.⁴ The pain was associated with flatulent dyspepsia (74%), while Huber³ reported overall incidence to be about 57 percent.

Thirty cases of choledocholithiasis were confirmed at operation. Twelve were confirmed by ultrasonography. However, in all the 30 cases, there were some elevation of alkaline phosphatase. Though none of the 6 cases of carcinoma of the head of the pancreas could be detected by ultrasonogram except dilatation of common bile duct, in both the 6 cases, serum alkaline phosphatase were elevated. In this regard it is important to remember that demonstration of a normal common bile duct by abdominal ultrasound and normal serum alkaline phosphatase together have 100% specificity in excluding bile duct stones⁵.

Prothrombin time which required correction due to significant abnormality by vitamin K were with 18 patients, all of these patient responded to vitamin K with return of prothrombin time to normal.

Gallstone was reported to have been present in 252 by USG. 249 was confirmed preoperatively. Three cases ultrasonically negative for gallstone were found to be so at laparotomy. So, for gallstone disease the sensitivity of USG in the test was 100%, specificity 75%. However, there was a false positive rate of 25%. In a study by Islam et al.⁶ in 1981, there was 65.2% concordance. Rahman et al.⁷ in 1991 there was a sensitivity of 98.68% and specificity of 26.31%. Anderson and Harned⁸ reported 95% specificity, whereas Bartrum et al.⁹ reported 99% specificity.

Choledocholithiasis was indicated by ultrasonogram in 12 cases. Peroperatively stone in common bile duct was found in 30 cases. Sensitivity of USG for common bile duct stone in this study was 40%, false negative rate detection was 60%. In similar series by Rahman et al.⁷, none of the 7 cases could be diagnosed preoperatively.

Sensitivity of USG for detection of stone in cystic duct in this study was 100%, as both the 2 cases of ultrasonographic findings were confirmed at operation. In soft tissue mass lesion of gallbladder, ultrasonographic sensitivity was 33.33% as only 1 of the 3 cases was found. In a study in 1992 by Wahab¹⁰, the

finding was 100% accurate though his series was small with 15 cases of gallbladder mass lesion in 300. All 15 cases could be diagnosed preoperatively. In detection of neoplastic lesion of common bile duct and pancreas, the sensitivity of USG in this test was insignificant as it could only detect the associated biliary dilatation.

Conclusion

Ultrasonography has become the most important method of examination of gallbladder. In chronic calculous cholecystitis and in choledocholithiasis, the ultrasound examination appeared to be accurate in 97% and 84.2% of cases, respectively. So, ultrasonography is a useful screening test for patients undergoing laparoscopic cholecystectomy and it can help to predict technical difficulties. Ultrasonography is the most important investigation in the diagnosis of biliary disease. It is very sensitive and specific in detecting biliary stones and dilatations of bile ducts. Ultrasonography is an instrument and operator-dependent examination and it is quick noninvasive, requires minimal preparation, avoids radiation and side-effects of contrast media, is independent of liver function and gastrointestinal upset. So, it should be the first investigation for biliary disease.

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